How to give a scientific presentation

Karl W Broman

Department of Biostatistics & Medical Informatics
University of Wisconsin – Madison

www.biostat.wisc.edu/~kbroman

Note

This is not a scientific presentation

Note

This is not a scientific presentation

What I say is the truth
(but not everyone will agree)

Note

This is not a scientific presentation

What I say is the truth
(but not everyone will agree)

This isn't a particularly good talk

Why give a talk?

- You're compelled to

- For practice (eventually, you'll be doing it a lot)

- To get a job (an indication of teaching ability)

- To tell people stuff

- To become known

- To get people to read your papers

Basic principles
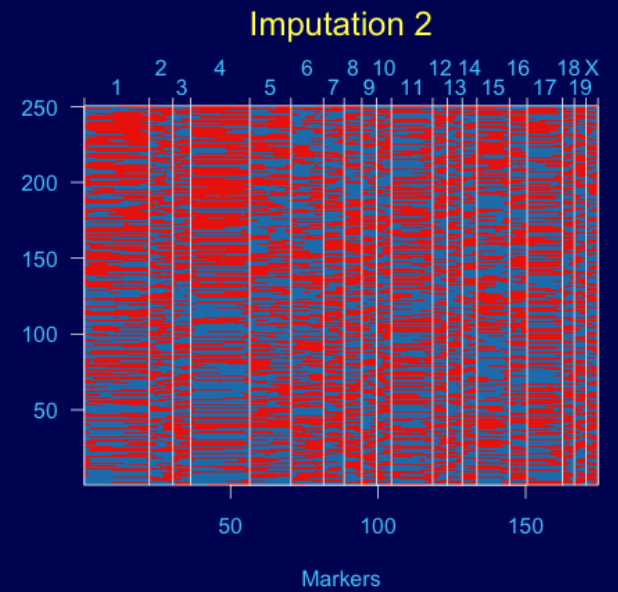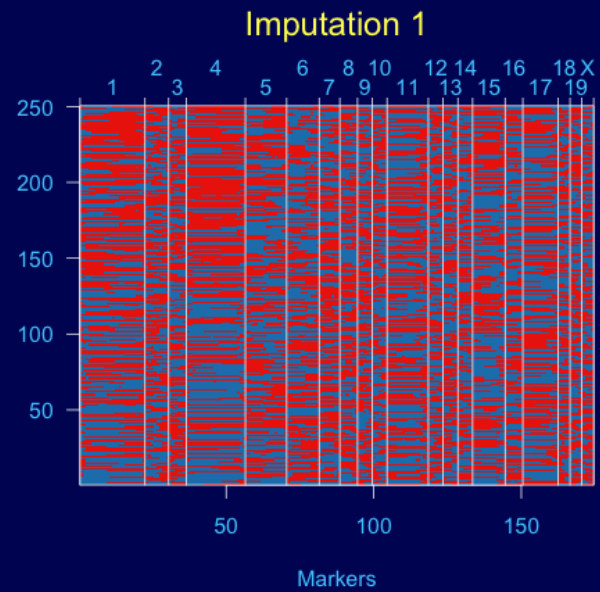
- Know your audience (don't overestimate them)

- Take it seriously (you're being judged)

- Keep things simple (have one or two key points)

- Tell a story

- There are lots of ways to be good (and bad)

- Know yourself (adopt another's style at great peril)

- Go to lots of talks and pay attention

- Images over text

Multiple imputation

Multiple imputations
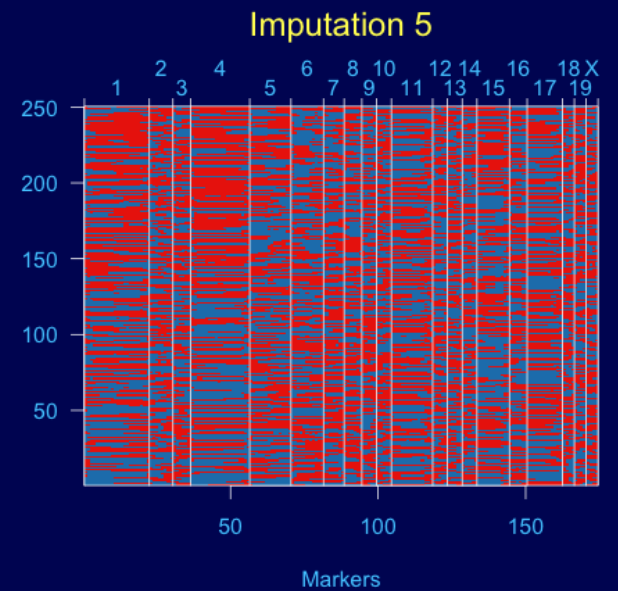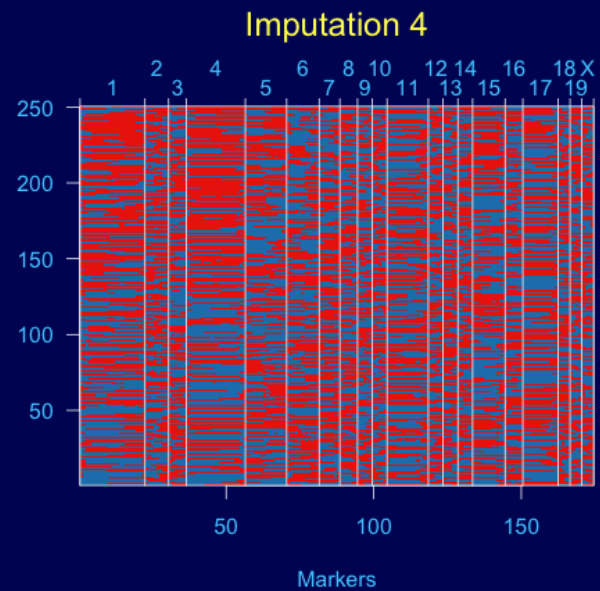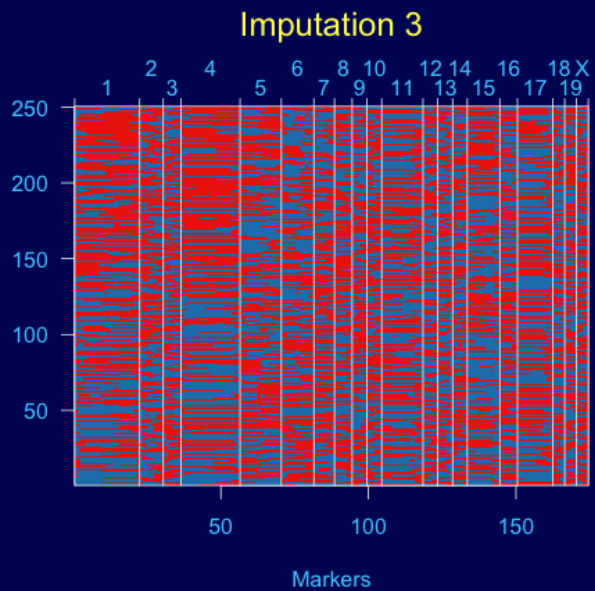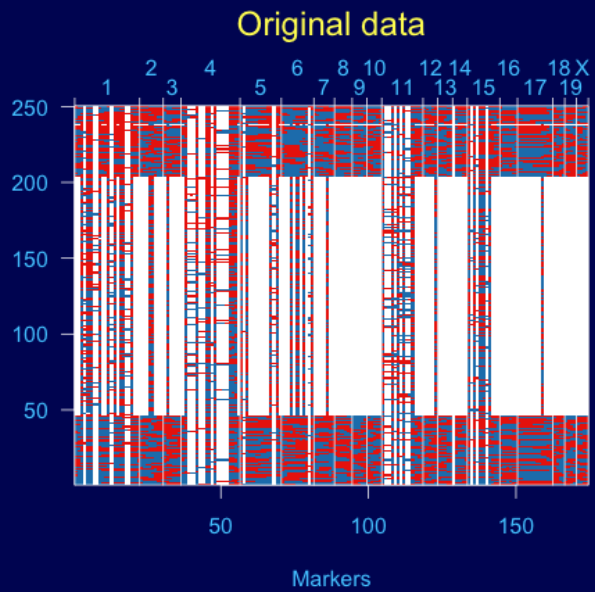
Imputation LOD curves
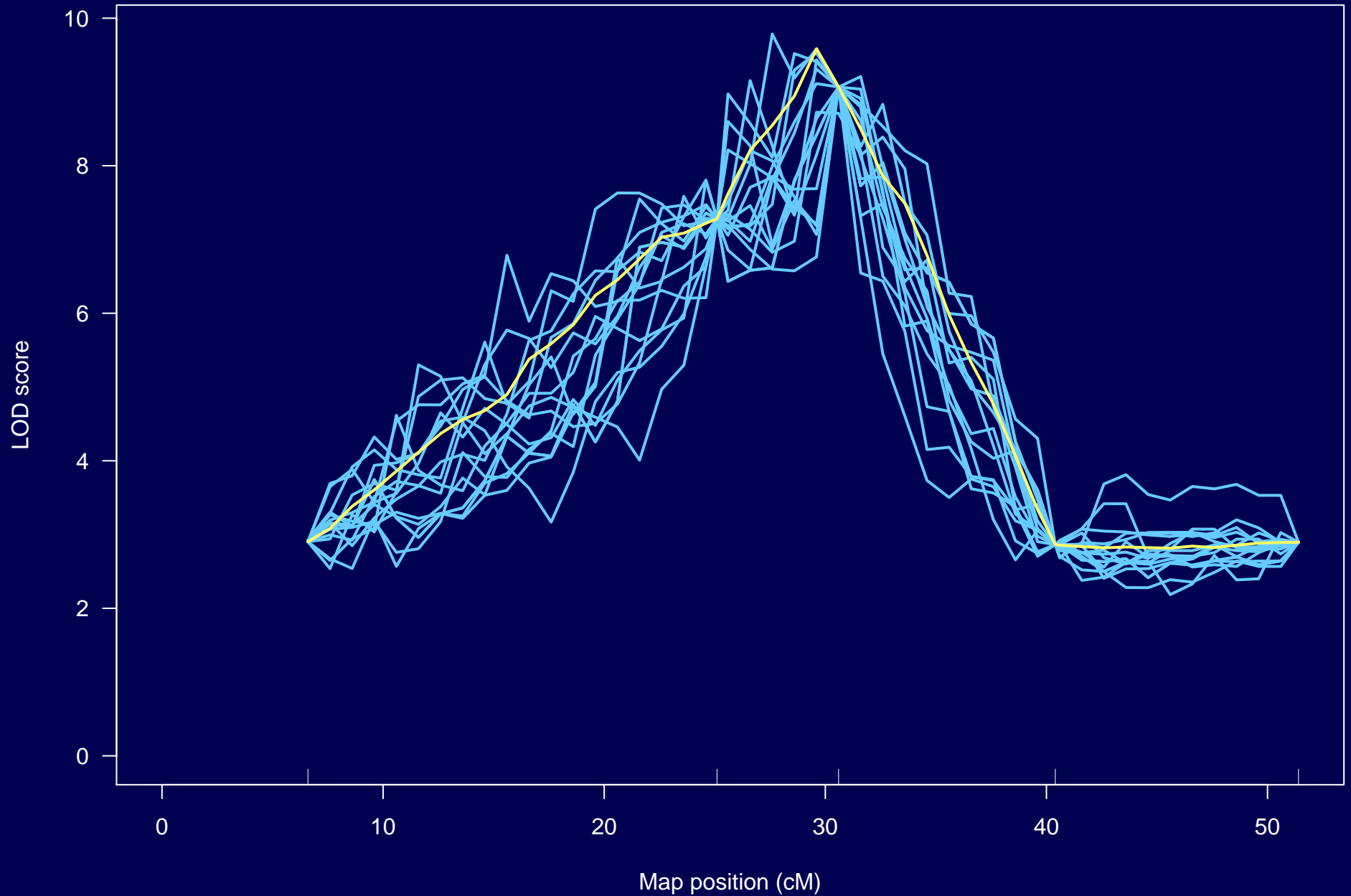
More basic principles

- Humor can be good

- Start with an application

- Nobody wants to hear the technicalities

- Give a good summary at the end

- Pay attention to your environment

- Don't bullshit; admit ignorance

- Don't go over the time limit

- The content is key

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim

- Cover everything you've ever done

Outline

- Background

- New method

- Simulation results

- Application

- Conclusions/future directions

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim

- Cover everything you've ever done

A bad figure

A better figure

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim

- Cover everything you've ever done

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim
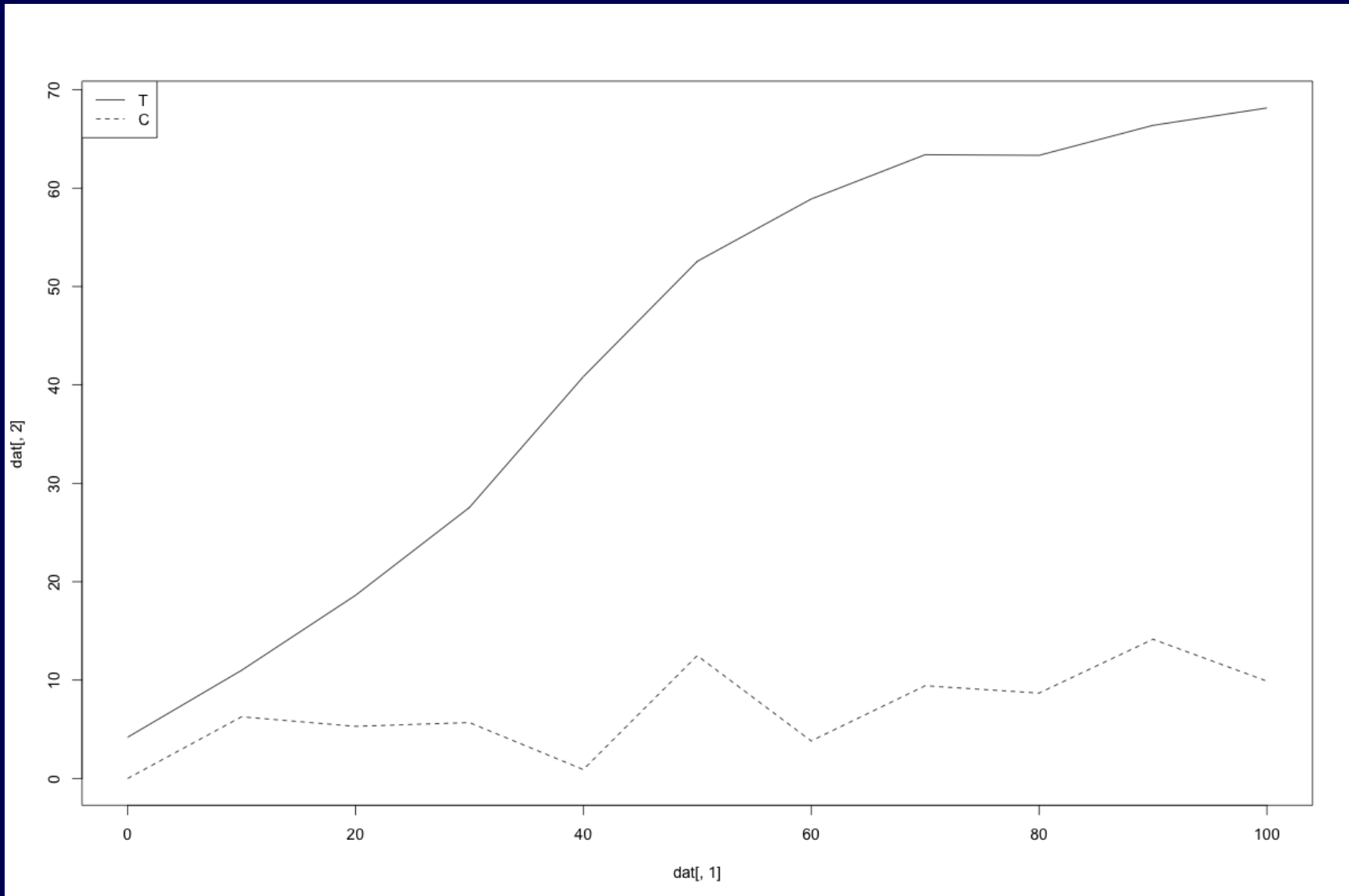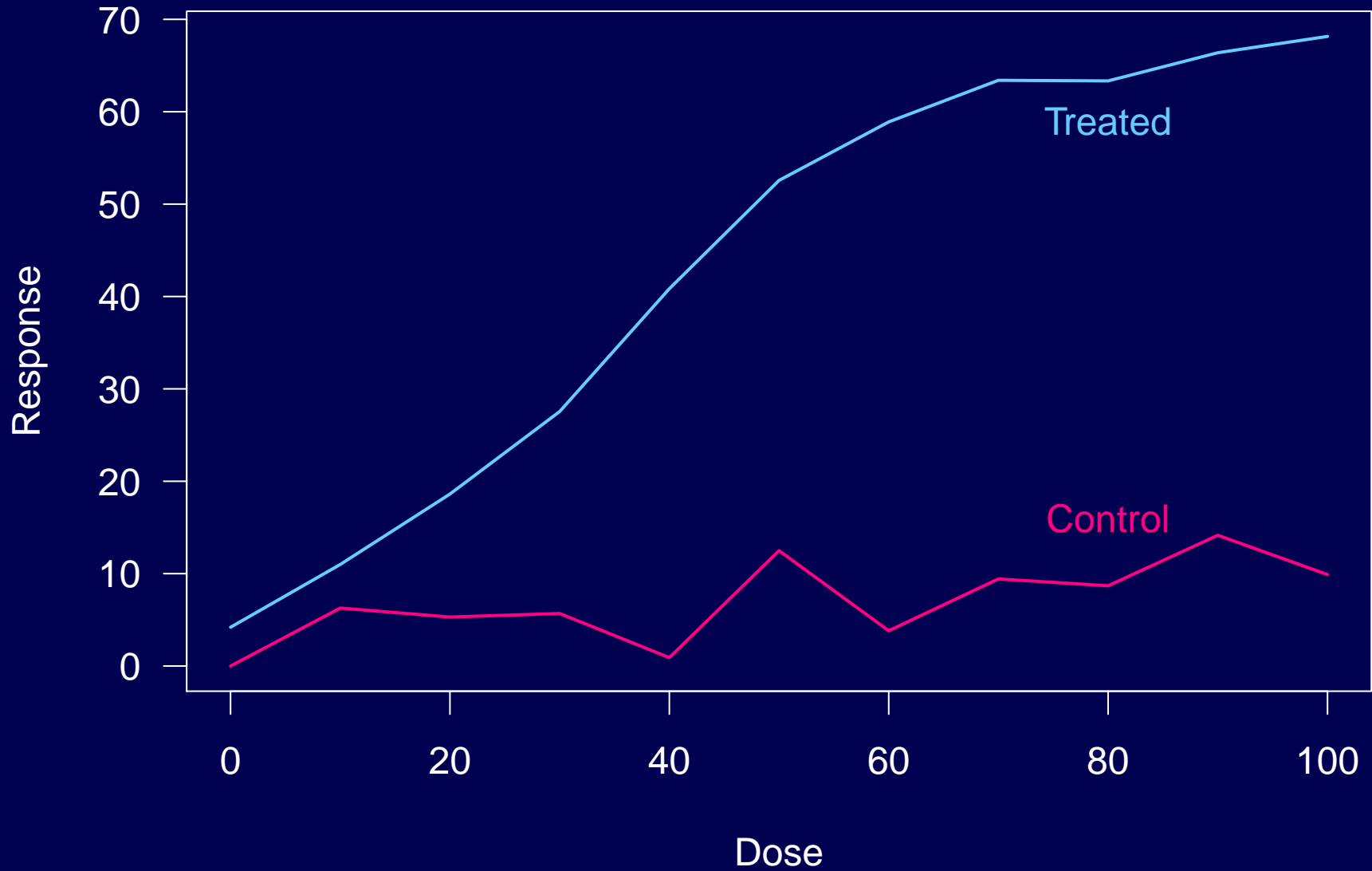
- Cover everything you've ever done

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim

- Cover everything you've ever done

A bad table

Table 5

Simulation results for using full data, CRs only, and proposed method under four missing mechanisms

Method	Bias[a] $(\hat{\beta}_W)$	$(\hat{\beta}_X)$	Variance[b] $(\hat{\beta}_W)$	$(\hat{\beta}_X)$	95% CI[c] $(\hat{\beta}_W)$	$(\hat{\beta}_X)$
			(M.1) $P(R=1) = 0.66$			
Full	0.01346	0.02229	0.04008	0.03685	0.955	0.950
Comp	0.03062	−0.003561	0.1149	0.06732	0.960	0.955
Impu	0.01431	0.021	0.04088	0.05169	0.980	0.975
			(M.2) logit $P(R=1) = 2Y$			
Full	0.007908	−0.02116	0.03838	0.03624	0.975	0.925
Comp	0.01945	0.07096	0.107	0.06581	0.960	0.950
Impu	0.006966	0.01597	0.04227	0.05226	0.975	0.985
			(M.3) logit $P(R=1) = 2X$			
Full	0.007908	−0.02116	0.03838	0.03624	0.975	0.925
Comp	0.01225	0.0589	0.08856	0.06818	0.980	0.975
Impu	0.009563	−0.04699	0.03865	0.04923	0.985	0.970
			(M.4) logit $P(R=1) = X + Y$			
Full	0.01346	0.02229	0.04008	0.03685	0.955	0.950
Comp	0.02404	1.613	0.1102	0.08202	0.955	0.580
Impu	0.01814	0.08289	0.0578	0.06075	0.955	0.970

[a]Bias $= (\hat{\beta} - \beta_0)/\beta_0$.

[b]Simulation variance.

[c]Confidence interval using jackknife standard error.

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim

- Cover everything you've ever done

Computer output?!?

```
> anova(aov(x ~ factor(d) * factor(sex)))
Analysis of Variance Table

Response: x
                      Df  Sum Sq Mean Sq F value Pr(>F)
factor(d)              4 203.661  50.915 49.3485 <2e-16 ***
factor(sex)            1   2.199   2.199  2.1317 0.1478
factor(d):factor(sex)  4   1.923   0.481  0.4660 0.7605
Residuals             90  92.858   1.032
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Ways to annoy me

- Spend a lot of time on a useless outline slide

- Unlabeled graphs; unreadable or meaningless labels

- Use graphs/tables straight from a paper

- Use a serif font (e.g., Times)

- Include lots of unnecessary digits

- Include raw computer output

- Read the slides verbatim

- Cover everything you've ever done

More ways to annoy me

- Skip the motivation

- Mumble

- Spend a lot of time discussing simulations

- Focus on your computer rather than the audience

- Use a noisy background

- Use a canned Powerpoint background

- Include your institution's logo on every slide

- Include other useless stuff on every slide

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- **Make extensive references to others' work**

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- **Use complicated notation that's hard to remember**

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Yet more ways to annoy me

- Use gratuitous animations

- Flash your laser pointer around constantly

- Make extensive references to others' work

- Write full paragraphs

- Spend a lot of time on technical details

- Use complicated notation that's hard to remember

- Have lots of typos

- Reveal just a bit at a time

Preparing the presentation

- What is the take-home message?

- What figures do you want to show?

- What background needs to be covered?

- Want a logical unfolding of the information

- Think carefully about the transitions

Slides

- Be consistent (colors, labels, layout)

- Polished, but not overly so

- Think carefully about colors (projector vs computer; color blindness)

- Use care regarding graphic type (jpeg/png vs pdf/ps)

- Design figures specifically for the talk

- Add more illustrations

- Know your slides (don't let them surprise you)

The text-free talk

- Can you do it with only pictures?

- Wordy slides seem more for the speaker than the audience

- Consider index cards (but don't drop them)

Practice

- Practice by giving talks (take every opportunity)

- Don't let practice kill your enthusiasm

- Think it through carefully (imagine what the audience is thinking)

- Focus on the transitions and the tricky bits

- Do you know how long it will take?

- "10 practice runs for one presentation" (Yikes!)

- Know what you need

- I usually have a good idea for my "opening"

- Videotape? (Not me!)

Delivery

- How to dress?   (reflects your respect for the audience)

- Exude enthusiasm and confidence

- Move around

- Look at the screen, with the audience

- Explain fully or not at all

- Don't apologize

- Avoid getting yourself stuck; feel free to stop and summarize

- Relax; slow down; occasional silence is okay

- You want the audience to care and understand

Nervousness

- Expect to be nervous (always)

- Be prepared

- Know your audience

- Have something to drink on hand

- It's probably not noticeable

- Use two hands with the laser pointer

- It's okay to screw up now and then (I think)

- It's easier when you care about what you're talking about

The 10 or 15 min talk

- Think: what is the goal?

- Explain the problem, sketch the solution, give a few results

- 5 – 15 slides

- Simplify, simplify, simplify

- If possible, choose the topic to fit the time limit

PDF vs Powerpoint

- Powerpoint can have terrible graph/font problems

- PDF (almost) always looks as expected
  - PDF can have font problems, too
  - technically you need to "embed" any non-standard fonts
  - but problems are rare.

- Powerpoint makes sharing slides easier

- Powerpoint can be easier to create

- Powerpoint: easier to have color and black/white versions

- Powerpoint's defaults are terrible

Q & A

- Listen

- Repeat the question

- Be gracious

- Admit ignorance

- "I'll have to give that some thought..."

- "I'm glad for the suggestion..."

- "I've thought about that, but haven't yet found a solution..."

- Don't say, "That's a great question!" for every question

Final thoughts

- You should be able to give a talk on your current work at a moment's notice

- Simulation results are almost always dreadfully boring

- Not every piece of work makes a good talk

- I always empty my pockets, just in case

- I like to have an index card with slide numbers

- Know your computer; adjust the screen/energy saver times

Resources

- M Alley (2002) The craft of scientific presentations: Critical steps to succeed and critical errors to avoid. Springer (Lots of fun stories about famous scientists)

- S Morgan, B Whitener (2006) Speaking about science: A manual for creating clear presentations. Cambridge University Press (A bit simplistic)

- RRH Anholt (2005) Dazzle 'em with style: The art of oral scientific presentation, 2nd edition. Academic Press (I didn't like it)

- PB Medawar (1979) Advice to a young scientist. BasicBooks

- RA Day, B Gastel (2006) How to write and publish a scientific paper, 6th edition. Greenwood Press

- PJ Feibelman (1993) A PhD is not enough! Addison Wesley

- Brad Efron (2013) Thirteen Rules.
  `http://www-stat.stanford.edu/~ckirby/brad/other/2013ThirteenRules.pdf`

`www.biostat.wisc.edu/~kbroman/presentations`